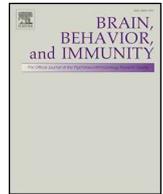




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At the height of the storm: Healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic peak of COVID-19



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ABSTRACT

This study reports the physical health, mental health, anxiety, depression, distress, and job satisfaction of healthcare staff in Iran when the country faced its highest number of total active COVID-19 cases. In a sample of 304 healthcare staff (doctors, nurses, radiologists, technicians, etc.), we found a sizable portion reached the cutoff levels of disorders in anxiety (28.0%), depression (30.6%), and distress (20.1%). Age, gender, education, access to PPE (personal protective equipment), healthcare institutions (public vs. private), and individual status of COVID-19 infection each predicted some but not all the outcome variables of SF-12, PHQ-4, K6, and job satisfaction. The healthcare workers varied greatly in their access to PPE and in their status of COVID-19 infection: negative (69.7%), unsure (28.0%), and positive (2.3%). The predictors were also different from those identified in previous studies of healthcare staff during the COVID-19 crisis in China. This study helps to identify the healthcare staff in need to enable more targeted help as healthcare staff in many countries are facing peaks in their COVID-19 cases.

Dear Editor,

COVID-19 hit Iran early and hard (Jahanshahi et al., 2020). The first confirmed case in Iran appeared on 19 February 2020, and active cases rise quickly since then, overwhelming healthcare workers. However, no study to date has examined the health conditions of healthcare staff in a major outbreak area beyond China. Furthermore, no study has examined their job satisfaction, even though job satisfaction is a critical motivational resource to prevent burnout during the outbreak (Zhang et al., 2020a).

This study reports the health conditions (SF-12, K6, PHQ-4) and job satisfaction of healthcare staff during the height of the COVID-19 pandemic in Iran in early April. We also identify risk factors to screen for healthcare staff in greater need for mental health services.

We first interviewed five doctors and nurses in different healthcare facilities, revealing that healthcare workers varied in PPE access, worked very long hours, and mostly had stayed away from their family for over a month to avoid bringing the virus home.

The survey took place on April 5–20, 2020. On April 5, the total active COVID-19 cases in Iran peaked at 32,612, and it is reasonable to think the healthcare demand during our survey period was very heavy. Table 1 presents the findings from the 304 healthcare workers in public and private hospitals in Iran. Of them, 2.3% (7) reported positive for COVID-19 infection, and 28.0% (85) were unsure, likely due to testing shortage. They varied in their access to PPE.

The mental health composite of SF-12 was 26.3 (7.5), significantly lower ($p < 0.001$) than those reported in three previous studies of 46.3 (10.4), 44.2 (10.8), and 44.6 (11.9) respectively (Montazeri et al., 2009; Rohani et al., 2010; Montazeri et al., 2011). The physical health composite of SF-12 was 40.7 (7.0), also significantly lower ($p < 0.001$; $p < 0.001$; $p < 0.05$) than reported in the above studies of 50.1 (8.5), 48.2 (8.2), and 42.3 (11.4). A sizable percentage of healthcare staff reached the cutoff values for mental disorder concerns on distress

(20.1% by K6), depression (20.6% by PHQ-4), and anxiety (28.0% by PHQ-4).

The regression results on SF-12 show that older workers enjoyed better mental but not physical health. Education level predicted physical and mental health. Female staff experienced more distress and depression. Compared to the 69.7% of staff who indicated COVID-19 negative, the 28.0% who were unsure had higher depression, anxiety and distress, and lower job satisfaction. Institutionally, healthcare workers at private institutions had better mental health. PPE access predicted better physical health and job satisfaction, and lower distress.

The predictors in our Iranian sample differ from those in Chinese healthcare samples. While gender predicted both anxiety and depression in Chinese samples (Lai et al., 2020), it predicted depression and distress but not anxiety in our Iranian sample. Age predicted anxiety and depression in Chinese samples (Lai et al., 2020) but predicted SF-12 mental health score in our sample. Education level predicted less depression in Chinese samples (Liu et al., 2020) but not in our Iranian sample.

Taken together, the results suggest distinct predictor patterns for healthcare staff's mental health in Iran versus China, resonating with an earlier study of an Iranian public sample (Jahanshahi et al., 2020). Jahanshahi et al. (2020) reasoned that “different countries vary in their medical systems, the availability of personal protective equipment (PPE), cultures, labor and employment conditions, the policies of lockdown, the ease of working from home and maintaining a living in a pandemic, and the information in both mainstream and social media”. Our results corroborate their suggestions and call for future research to identify mental health predictors for the public and healthcare staff in different countries during the COVID-19 pandemic.

Our research uncovered unique risk factors. First, PPE access predicted better physical health and job satisfaction and less distress, demonstrating its importance beyond physical protection. Second, those staff who were unsure whether they had COVID-19 were more

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Table 1
Descriptive statistics and risk factors of the health conditions (SF-12, PHQ-4 and K6) and job satisfaction among healthcare staff (*p < 0.5).

Variables (N = 304)	Mean + s.d or No. (%)		Physical health (SF-12)	Mental health (SF-12)	Anxiety (PHQ-4)	Depression (PHQ-4)	Distress (K6)	Job satisfaction
	β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)	β (95%CI)
Mean + s.d.								
Age	35.1 ± 9.1	40.7 ± 7.0	26.3 ± 7.5	2.0 ± 1.5	2.1 ± 1.4	14.8 ± 5.3	3.3 ± 0.7	
Gender	Male	reference	reference	reference	reference	reference	reference	
	Female	126 (41.4%) 178 (58.6%)	−0.061 (−0.174; −0.052)	0.230* (0.106; 0.355)	−0.021 (−0.044; 0.001)	−0.020 (−0.040; 0.000)	−0.038 (−0.115; 0.040)	−0.004 (−0.015; 0.007)
Marital status	Single	114 (37.5%)	1.040	0.110	0.354	0.457*	2.140*	−0.052
	Married without child	57 (18.7%)	(−0.865; 2.944)	(−1.995; 2.214)	(−0.016; 0.723)	(0.117; 0.796)	(0.851; 3.429)	(−0.235; 0.130)
	Married with one child	61 (20.0%)	0.030	−0.225	−0.004	0.030	−0.124	0.031
	Married with more than one children	69 (22.7%)	(0.865; 0.925)	(−1.214; 0.764)	(−0.170; 0.163)	(−0.124; 0.183)	(−0.706; 0.458)	(−0.051; 0.113)
Education level	Others (i.e. divorced)	3 (1.0%)	0.977*	−0.902*	0.058	0.115	0.084	0.026
	Under diploma	7 (2.3%)	(0.204; 1.750)	(−1.757; −0.047)	(−0.091; 0.207)	(−0.022; 0.252)	(−0.436; 0.604)	(−0.047; 0.100)
	Diploma (12 years)	21 (6.9%)						
	2-years college	37 (12.2%)						
	Graduated or studying a bachelor degree	143 (47.0%)						
Access to PPE (Personal Protective Equipment)	Graduated or studying a master degree	43 (14.1%)						
	Graduated or studying a doctoral degree	53 (17.4%)						
	Never	14 (4.8%)	1.875*	−0.404	−0.069	−0.084	−0.570*	0.150*
	Rarely	45 (15.4%)	(1.027; 2.724)	(−1.342; 0.534)	(−0.223; 0.085)	(−0.226; 0.057)	(−1.107; −0.033)	(0.074; 0.226)
Public or private institution	Sometimes	89 (30.5%)						
	Very often	78 (26.7%)						
	Always	66 (22.6%)						
	Public	223 (73.4%)	reference					
COVID-19 infection status	Private	81 (26.6%)	0.193	2.349*	−0.128	−0.006	0.603	−0.079
	Negative	212 (69.7%)	(−1.895; 2.281)	(0.041; 4.657)	(−0.521; 0.264)	(−0.367; 0.355)	(−0.768; 1.973)	(−0.273; 0.116)
	Unsure	85 (28.0%)	Reference					
	Positive	7 (2.3%)	−1.081 −3.482 (−9.992; 3.027)	−0.727 1.807 (−5.388; 9.002)	0.688* 0.157 (−0.956; 1.271)	0.449* −0.193 (−1.217; 0.830)	1.649* 1.481 (−2.406; 5.367)	0.260* 0.191 (−0.360; 0.741)

distressed and anxious, and less satisfied with their jobs, implying psychological harm of uncertainty (Zhang et al., 2020b). Third, workers at private institutions had better mental health than those in public institutions, suggesting to identify possible areas of improvement for public institutions.

While risk factors in this study predict various outcomes, we did not find a universal risk factor that predicted all outcome variables, highlighting a challenge to identify specific risk factors for specific mental disorders during the ongoing COVID-19 pandemic.

In conclusion, the risk factors for healthcare staff in Iran differed from those in China. As countries vary in their medical systems and clinical capacity, future studies should examine healthcare workers' health conditions and their predictors in individual countries, given protecting their health and satisfaction is paramount during the COVID-19 pandemic.

CRedit authorship contribution statement

Stephen X. Zhang: Conceptualization, Investigation, Methodology, Formal analysis, Visualization, Writing - original draft, Writing - review & editing, Supervision. **Jing Liu:** Visualization, Writing - original draft, Writing - review & editing. **Asghar Afshar Jahanshahi:** Investigation, Resources, Conceptualization, Writing - review & editing. **Khaled Nawaser:** Investigation. **Ali Yousefi:** Investigation. **Jizhen Li:** Writing - review & editing, Funding acquisition. **Shuhua Sun:** Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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